

4-6 October, Nationals Park, Washington DC

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## Free your mind

How Suffolk and nPlan tackled cognitive bias to de-risk the construction of a new hospital - using AI

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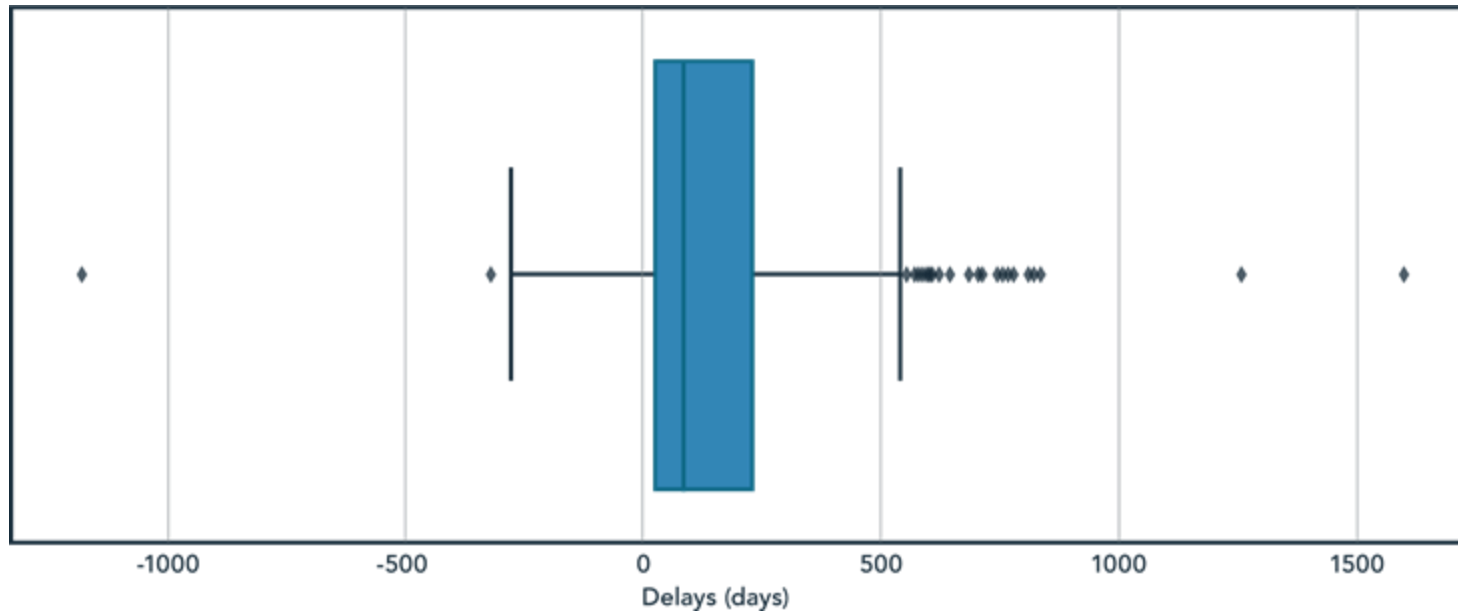
 **Project Controls**  
**EXPO**  
Washington, DC - USA

# Only one out of every seven large-scale projects finishes on time



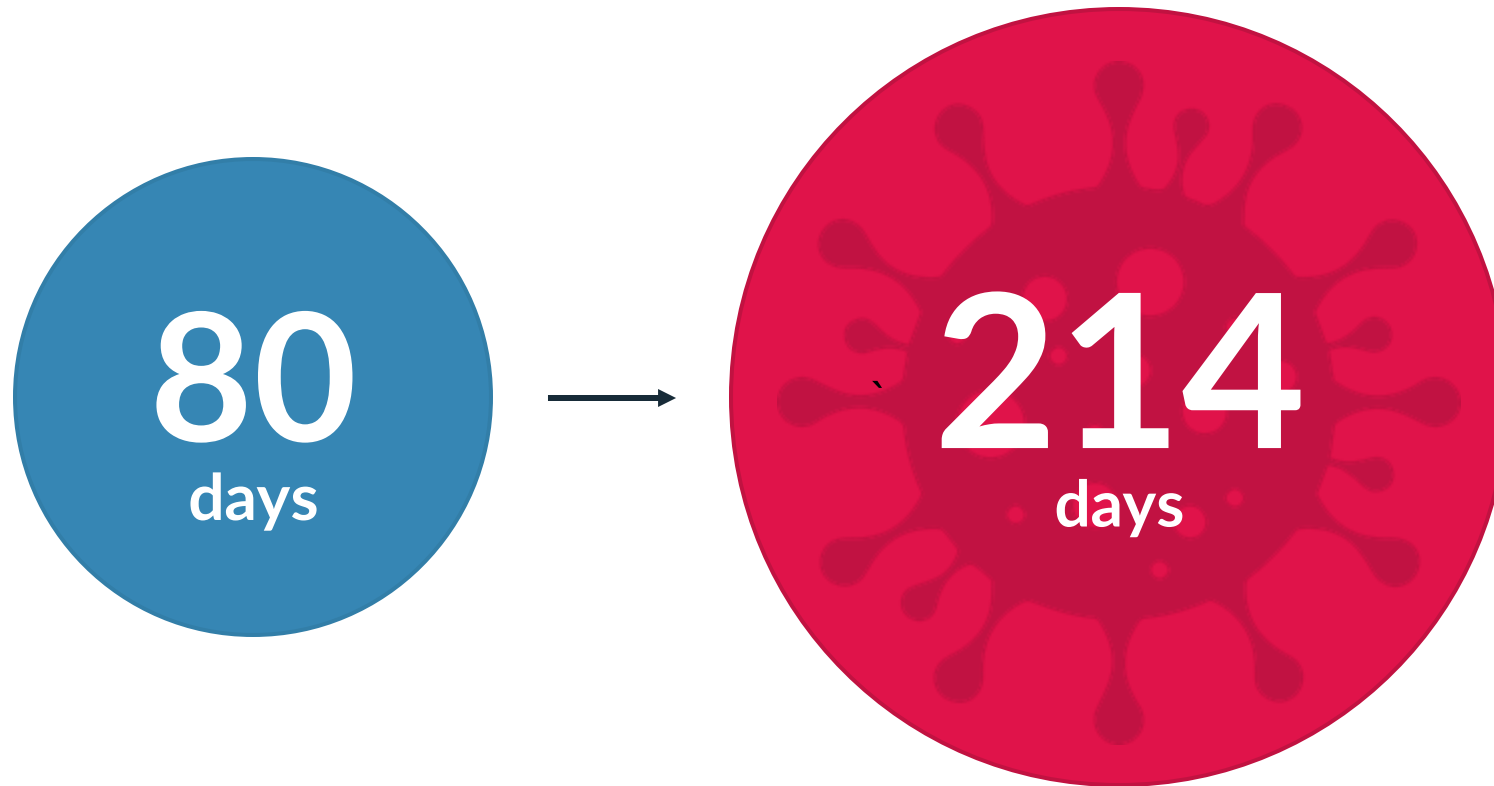
\*Based on analysis of large-scale projects (worth >£100m) executed between 2005 and 2021; source: nPlan

# The median large-scale project is delayed by 87 days



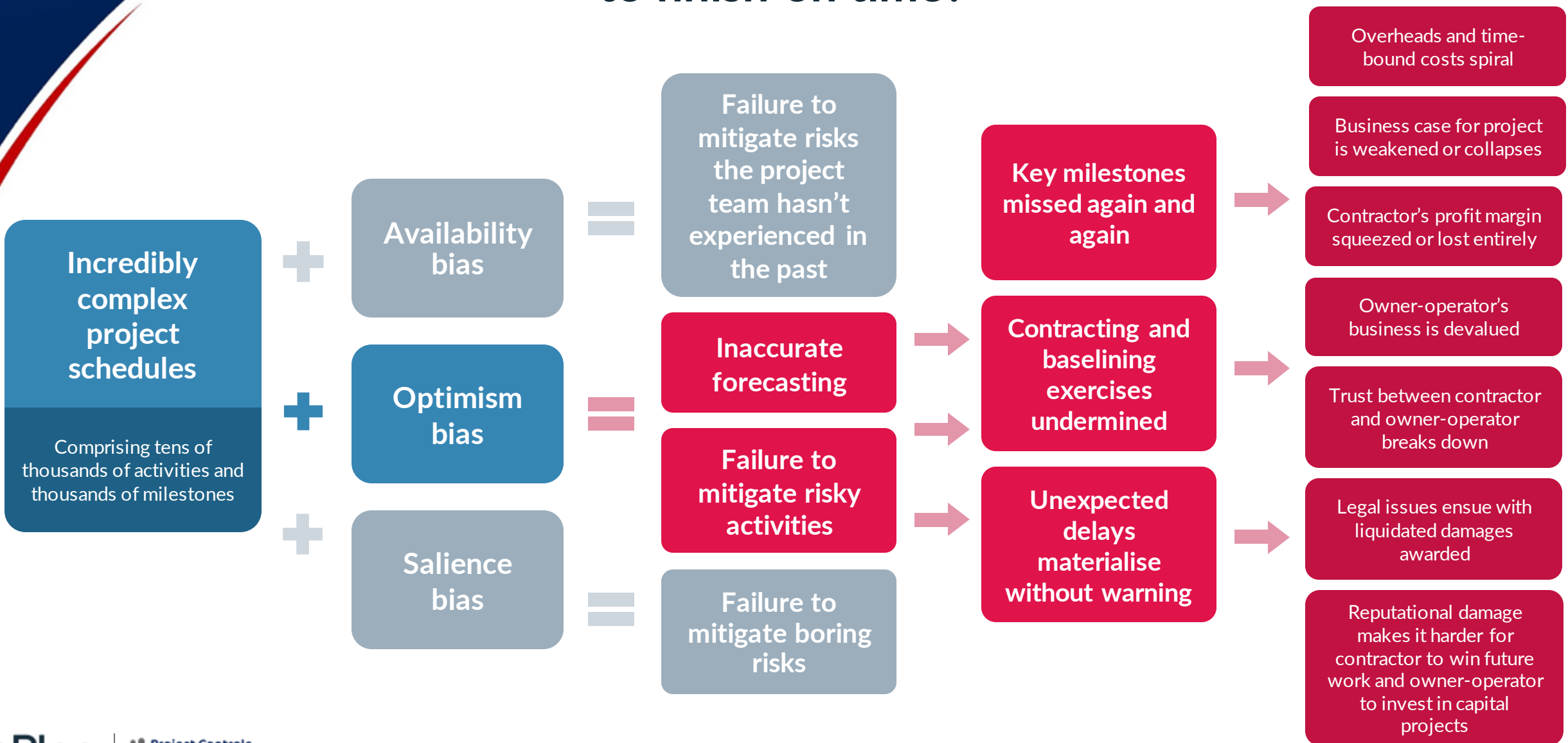
\*Based on analysis of large-scale projects (worth >£100m) executed between 2005 and 2021; source: nPlan

# The median large-scale project delay increased by 167% during the pandemic

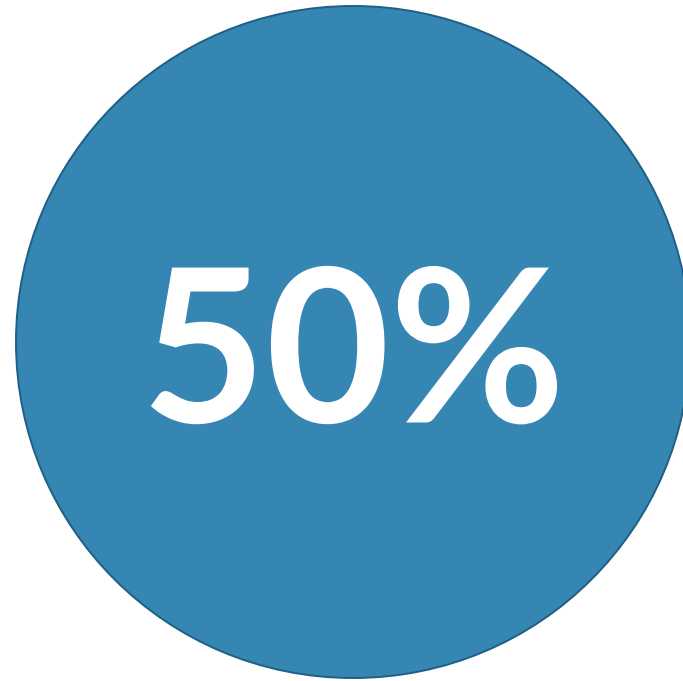


\*Based on analysis of large-scale projects (worth >£100m) executed between 2005 and 2021; source: nPlan

# Why do so many large capital projects **FAIL** to finish on time?



# The optimism bias trap

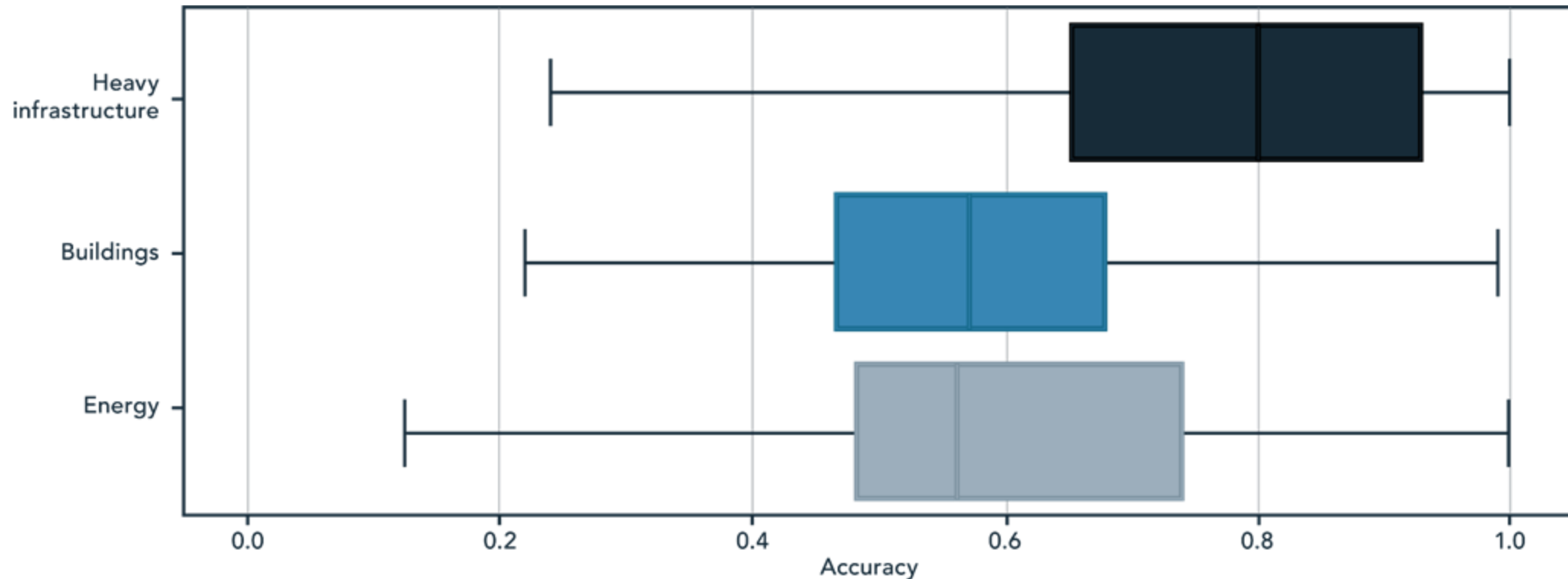


Proportion of people who  
\*think\* they're free of  
optimism bias



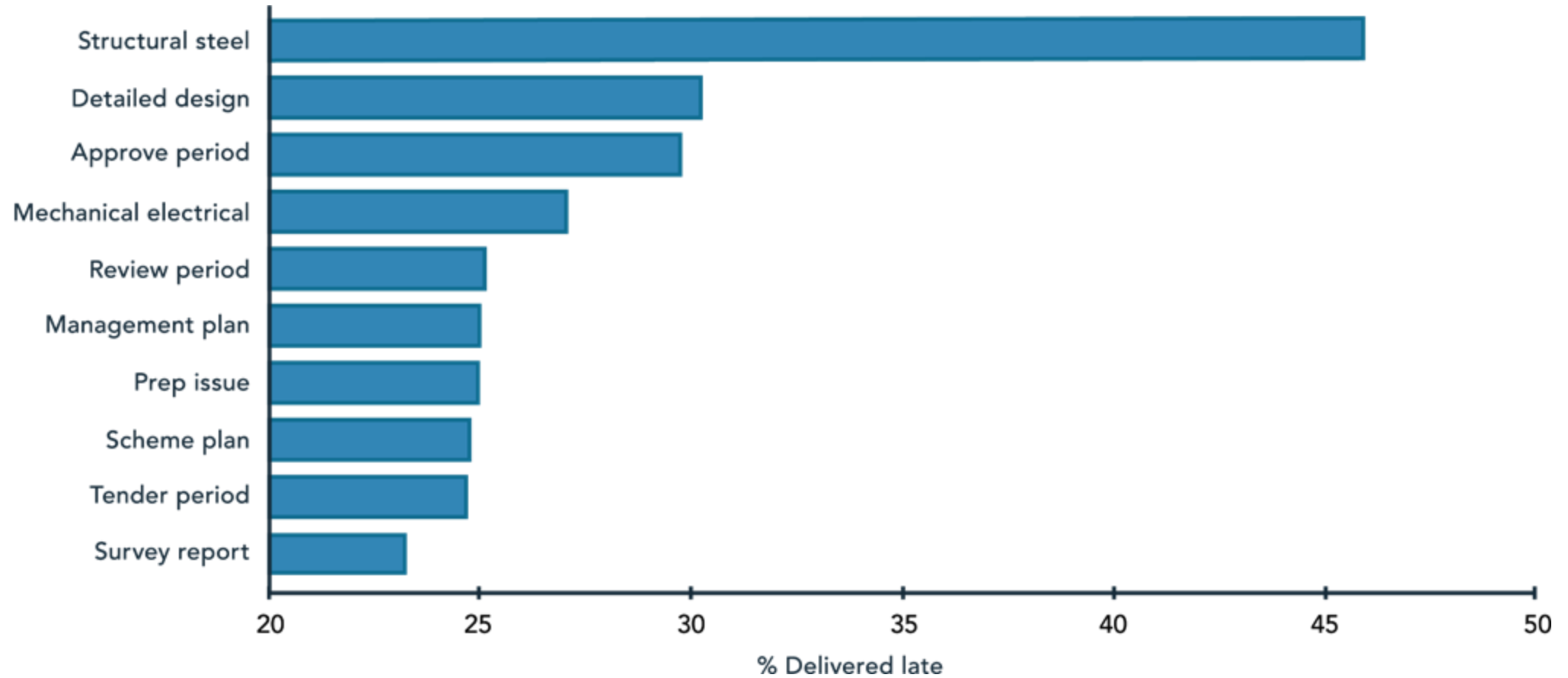
Proportion of people who  
are actually likely to be  
free of optimism bias

# Optimism bias in action: project teams consistently underestimate how long activities take



\* Based on analysis of activities in >500,000 actualised schedules from large-scale projects (worth >£100m) executed between 2005 and 2021; source: nPlan

# 8 of the 10 most optimistically planned activities relate to review and approval processes



\* Based on analysis of activities in >500,000 schedules from large-scale projects (worth >£100m) executed between 2005 and 2021; source: nPlan







# nPlan

Founded in the

**UK**  
in 2017

**Hypothesis: we can use AI to identify risks and forecast projects**

Taking optimism bias (and a bunch of other biases) quite literally out of the equation and going a long way towards solving the problem of delayed projects

Secured

**\$22M**

In funding from backers including Google Ventures, the founder of Deepmind, and the former CEO of McKinsey

Customers include:



Google

SKANSKA

Team of

**70**

- and growing

Has amassed over

**550,000**

Construction schedules creating the biggest dataset of its kind in the world

# How nPlan works

1

Historical project schedules are shared with nPlan



Schedules contain data on activity durations, order of activities, activity contexts and more



2

Deep Learning is used to turn historical schedules into models that reflect how projects turn out



Understanding of how different activities are connected



Distributions for every schedule activity

3

Machine Learning is used to infer how a new schedule will be executed based on the model we've made

Risks identified



Opportunities identified



Accurate forecast



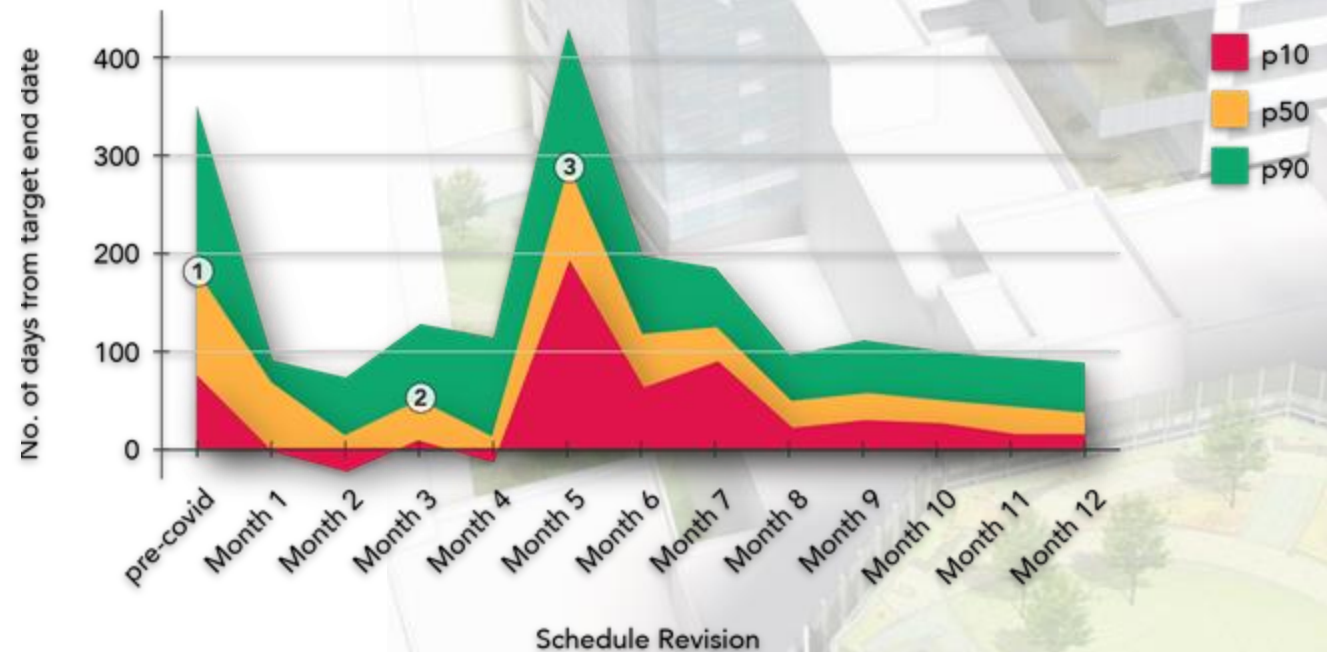
Case study time!  
Let's dive in...



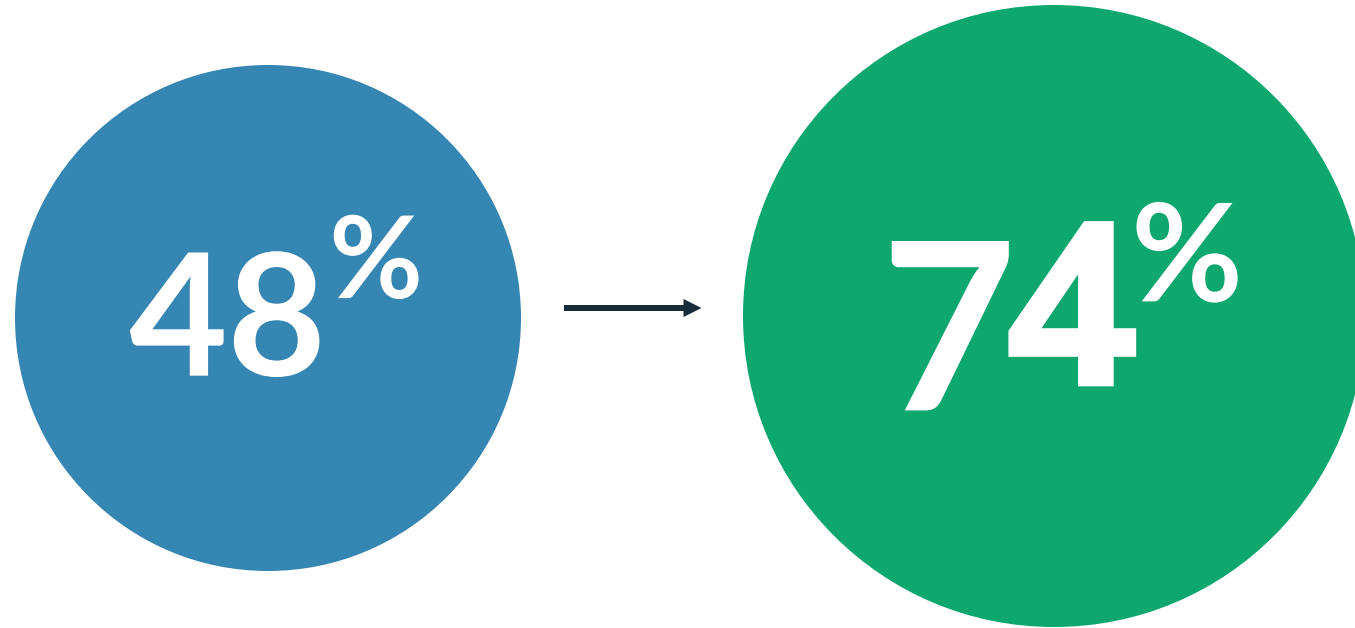
# Case Study #1: A Unique Hospital Project

- Project value: \$600m
- Location: Boston
- Construction of an 11-story building with an innovative hybrid operating suite featuring a unique trolley MRI system
- Completed: December 2021

nPlan successfully forecast the three riskiest periods of the project before they occurred



# nPlan's AI dramatically improved the accuracy of Suffolk's activity-level forecasting on the hospital project



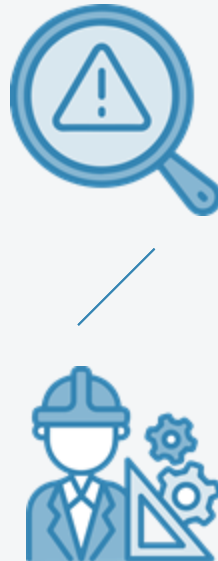
nPlan's AI out-performed human forecasters by a significant margin, with a tighter range of error and more balanced outcomes

# Just one of the risks flagged by nPlan allowed Suffolk to avoid 20 days of delay

nPlan AI identified  
risk from 'testing  
and balancing' activity



nPlan risk engineers worked  
with Suffolk project team to  
mitigate



Suffolk adopted the  
recommendation and avoided...

**20**  
Days of delay

**\$1.25M**  
Cost of delay

## Case study #2: Spanish Peaks Mountain Club

- Project value: \$400m
- Location: Montana
- Construction of a luxury resort with 150 guest rooms, 39 residences and 12,870 square feet of meeting and event space
- Completed: November 2021

“

nPlan does expose things in the schedule and it really challenges our biases in the schedule...we had tunnel vision on the project focusing on single areas - especially the inside of condos. At the end the outside of condos was just as important, we ended up hiring a second superintendent to manage the outside works as well as the inside work.

”

- Kevin Bonett  
Project Manager on Spanish Peaks

48

Days of delay  
avoided

**Mitigating just five of the risks  
flagged by nPlan's AI allowed  
Suffolk to avoid nearly 50 days of  
delay**



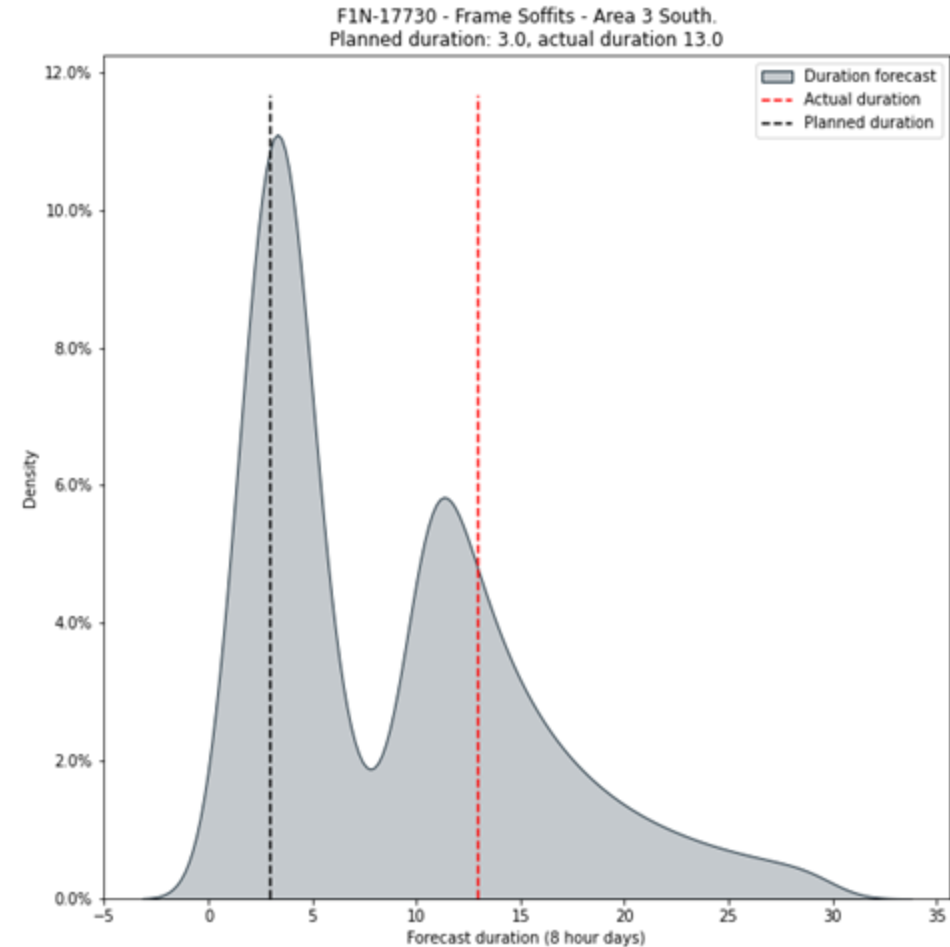
# The distributions in nPlan's dataset allow us to quantify risks in a sophisticated way

3  
days

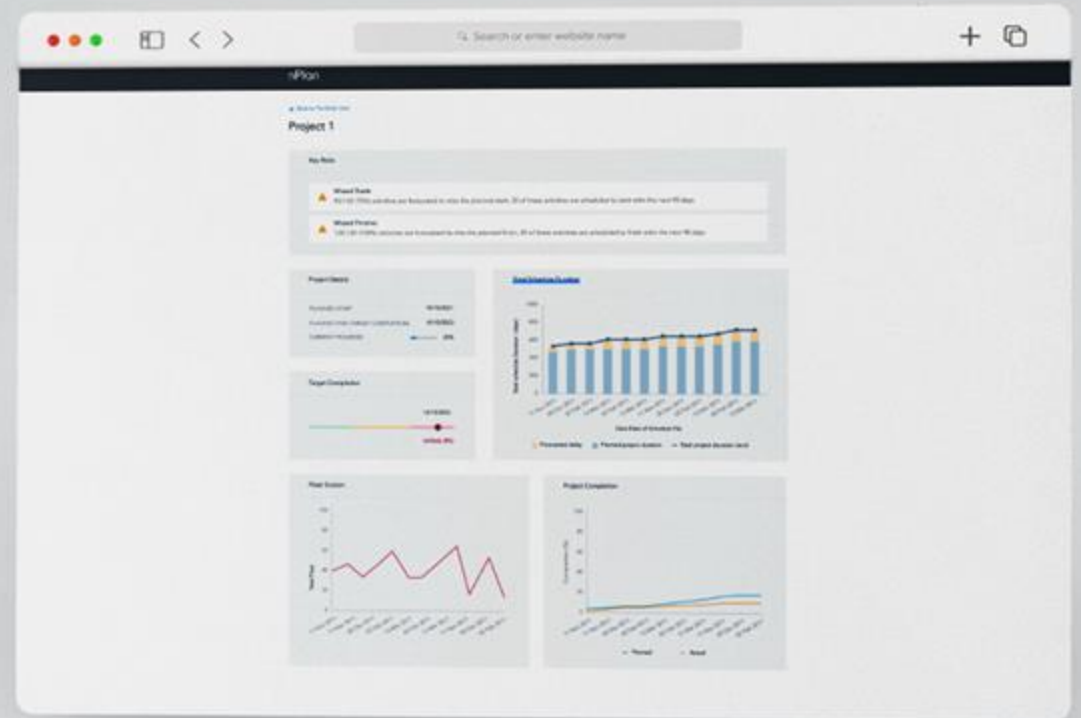
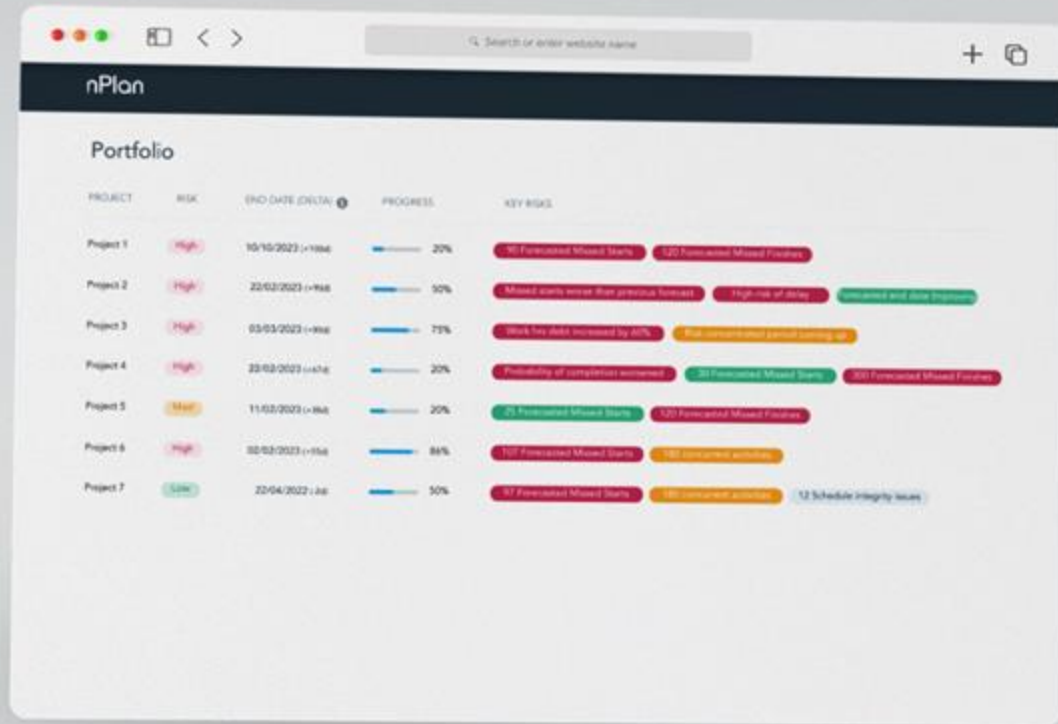
Planned duration  
of this activity

13  
days

Actual duration  
of this activity



# The future for nPlan and Suffolk - portfolio risk



# Key takeaways from this presentation

1

**Optimism bias** is one of the root causes of large-scale construction projects finishing late and over-budget

2

Suffolk's partnership with nPlan demonstrates that we can use **AI to counteract the effect of optimism bias** when forecasting and de-risking projects

3

Any contractor or owner-operator with schedule data from past projects can get set-up to use AI to forecast and manage risk in a matter of days



# THANK YOU